

# Rocky Flats Environmental Technology Site

## 4-I63-ENV-OPS-FO.45

REVISION 0

### CHEMICAL HANDLING AND MIXING OPERATIONS OPERABLE UNIT 2, FIELD TREATABILITY UNIT

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## **1 PURPOSE**

This procedure describes the administrative and operational steps used at Rocky Flats Environmental Technology Site for process chemical handling for the Operable Unit 2 (OU2) Field Treatability Unit (FTU) treatment system equipment contained in Trailers (T) 900A and 900B

## **2 SCOPE**

This procedure applies to all Environmental Restoration Program Division (ERPD) Operations and subcontractor personnel.

This procedure addresses the following topics

- Automatic filling of Cleaning Chemical Tank TK-9 or Cleaning Flush Tank TK-10
- Manual filling of TK-9 and TK-10
- Chemical cleaning solution make-up in TK-9
- Filling and adding chemicals to Ferric Sulfate Feed Tank TK-4
- Filling and adding chemicals to Auxiliary Feed Tank TK-5
- Filling and adding chemicals to Lime Coagulant Chemical Feed Tank TK-6
- Filling and adding chemicals to Outside Acid Tank

## **3 OVERVIEW**

This procedure implements the requirements for safe chemical handling for the FTU treatment equipment at OU2

This procedure was established to ensure that chemical handling operations for the preparation of process chemicals for the OU2 FTU treatment system are accomplished in a uniform and safe manner. This procedure is used by the operator(s) during all chemical handling operations of the OU2 FTU treatment system.

## **4. RESPONSIBILITIES**

### **4.1 Operator**

Operates and monitors the FTU system equipment.

Reports abnormal conditions, occurrences, and incidents to Shift Foreman.

Ensures that visitors comply with the Rocky Flats Environmental Technology Site Operable Unit 2 Field Treatability Unit Health and Safety Plan (HASP)

Completes the required logs and forms

**4.2      Responsible Manager**

Ensures that all personnel including subcontractors, are trained and qualified to perform the duties, tasks, and responsibilities as described in this procedure

Ensures that all core and ERPD-specific training has been completed and documented, and that copies of all documentation have been forwarded to the ERPD training files

**4.3      Shift Foreman**

Responds to and reports all spills in accordance with 1-10000-HWR, Hazardous Waste Requirements Manual, Section 4.0

**5            LIMITATIONS AND PRECAUTIONS**

- Wherever chemicals are stored and dispensed extreme care shall be taken
- Operators shall be trained in the safe handling of all reagents and shall know what particular precautions should be taken regarding the microfiltration system
- The HASP is the governing safety document and shall be followed by all ERPD Operations Support and subcontractor personnel
- Water shall always be added first before adding chemicals to the cleaning chemical tank
- When filling a tank, the filling operator shall not leave the vicinity of the tank and shall ensure that the tank is not overfilled by visually monitoring tank level
- Tank fill valves shall be operated slowly
- Rapid operation of fill system valves during water treatment operations can cause a waterhammer through the Granulated Activated Charcoal (GAC) system and cause rupture disc failure

**6 PREREQUISITES**

**6.1 Field Preparation**

**Operator**

- [1] Ensure that fill water is available from TK-11
- [2] Ensure that the pH in TK-11 is between 6.0 - 9.0 su
- [3] Ensure that electrical power is available at the T900A and T900B control panels
- [4] Ensure that the required chemicals are available to perform this procedure

7 INSTRUCTIONS

7.1 Automatic Tank Fill

**NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running*

**NOTE 2** *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate depending on control logic*

**Operator**

[1] Verify that all applicable prerequisite actions in Section 6 Prerequisites, have been completed and record in the OU2 Operations Log Book

[2] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP

**NOTE** *Placing the TANK FILL SELECT switch to OFF will stop the tank fill cycle manually*

[3] Select TK-9 or TK-10 to be filled by positioning the TANK FILL SELECT switch

[4] **IF** filling either of the cleaning system tanks is required while processing waste water **THEN** perform one of the following to prevent the possibility of blowing a rupture disk in the lead GAC column when tank filling is completed

[A] Reduce the effluent flow controller by 15 gpm

**NOTE** *Performing Steps [B] or [C] requires that the operator monitor the tank level increase while flow is being diverted*

[B] Place the AV-18 control switch to HAND to divert flow to TK-10

[C] Place the AV-16 control switch to HAND to divert flow to TK-9

[5] **IF** filling TK-10 is required  
**THEN**

[A] Verify that AV-14 and AV-17 control switches are in AUTO

[B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND or AUTO

[C] Press the TANK FILL START pushbutton to initiate the fill cycle

**7.1 Automatic Tank Fill (continued)**

**Operator (continued)**

- [D] Ensure the following automatic actions occur
  - AV-14 and AV-17 open
  - AV-14 and AV-17 close when high level is reached in TK-10
- [E] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF after filling TK-10
- [6] IF filling TK-9 is required,  
THEN
  - [A] Verify that AV-14 and AV-15 control switches are in AUTO.
  - [B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND
  - [C] Press the TANK FILL START pushbutton to initiate the fill cycle
  - [D] Ensure that the following automatic actions occur
    - [a] AV-14 and AV-15 open
    - [b] AV-14 and AV-15 close when high level is reached in TK-10
  - [E] WHEN filling TK-9 is complete,  
THEN place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF
- [7] Record all activities in the OU2 Operations Log Book.

**7.2 Manual Tank Fill**

**CAUTION**

**Manual filling of the cleaning system tanks bypasses automatic level controls.**

- NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running*
- NOTE 2** *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate, depending on control logic*

**Operator**

- [1] Verify that all applicable prerequisite actions in Section 6, Prerequisites, have been completed and record in the OU2 Operations Log Book.



**7.2 Manual Tank Fill (continued)**

**Operator (continued)**

- [2] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP
- [3] **IF** manual filling of Flush Tank TK-10 is required  
**THEN**
  - [A] Place the AV-14 and AV-17 control switches in HAND
  - [B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND
  - [C] Visually monitor the level increase in TK-10
  - [D] **WHEN** the desired water level in TK-10 is obtained,  
**THEN** place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF
  - [E] Place the AV-14 and AV-17 control switches in OFF
- [4] **IF** manually filling of Chemical Tank TK-9 is required,  
**THEN**
  - [A] Place the AV-14 and AV-15 control switches in HAND
  - [B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND
  - [C] Visually monitor the level increase in TK-9
  - [D] **WHEN** the desired water level in TK-9 is obtained,  
**THEN** place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF
- [5] Record all activities in the OU2 Operations Log Book

**7.3 Chemical Cleaning Solution Make-up in Cleaning System Chemical Tank TK-9**

- NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running*
- NOTE 2** *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate depending on control logic*

**Operator**

- [1] Verify that all applicable prerequisite actions in Section 6, Prerequisites, have been completed and record in the OU2 Operations Log Book

**7.3 Chemical Cleaning Solution Make-up in Cleaning System Chemical Tank TK-9  
(continued)**

**Operator (continued)**

[2] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP

[3] Ensure that all of the following pump control switches are in OFF

- CLEANING PUMP CP-1
- FILTRATE TRANSFER PUMP TP-11-1
- SEAL FLUSH WATER PUMP TP-11-2
- SLUDGE PUMP SP-1
- FEED PUMP FP-1

**NOTE 1** *When an acid solution is prepared, 20 gal of 93% to 98% sulfuric acid is added to 250 gal of water. The acid solution may be reused for cleaning cycles as discussed in 4-I60-ENV-OPS-FO 42, Chemical Cleaning Operations Operable Unit 2, Field Treatability Unit*

**NOTE 2** *When a bleach solution is prepared, five 55-gal drums of 10% bleach are added to TK-9. More dilute solutions may be prepared.*

**NOTE 3** *When a hydrogen peroxide solution is prepared, 10 to 15 gal of 35% hydrogen peroxide is added to the acid solution just before and during the cleaning cycle in accordance with 4-I60-ENV-OPS-FO 42*

**NOTE 4** *There are various other chemical cleaning solutions which may be employed for cleaning the membranes in the OU2 FTU. These variations include hydrogen peroxide in water only (no acid), sodium hypochlorite in concentrations up to 15%, and hydrochloric acid and water. The instructions may be varied concerning the amount of water initially contained in TK-9 and the amount of cleaning chemical(s) added to obtain the desired cleaning chemical mixture*

[4] Add the required amount of clean water to Chemical Tank TK-9 for the chemical solution that is to be prepared in accordance with Section 7.1, Automatic Tank Fill or 7.2, Manual Tank Fill

[5] IF TK-9 contains too much acid solution for preparing the desired chemical mixture, THEN pump the excess acid solution to TK-8 as follows

[A] Verify that enough capacity exist in TK-8 to receive the excess acid solution

**7.3 Chemical Cleaning Solution Make up in Cleaning System Chemical Tank TK-9  
(continued)**

**Operator (continued)**

- [B] Open the following valves
  - V-101
  - AV-11
  - AV-12
  
- [C] Place the SEAL FLUSH WATER PUMP TP-11-2 control switch in AUTO
  
- [D] Place the CLEANING PUMP CP-1 control switch in HAND
  
- [E] **WHEN** the desired level in TK-9 is reached **OR** the TK-9 high-level alarm is no longer annunciating  
**THEN** place the CP-1 control switch in OFF
  
- [F] Place the SEAL FLUSH WATER PUMP TP-11-2 control switch in OFF
  
- [G] Close the following valves
  - V-101
  - AV-11
  - AV-12
  
- [6] **IF** TK-9 contains too much bleach solution for preparing the desired chemical mixture,  
**THEN** refer to 4-I60-ENV-OPS-FO 42
  
- [7] Fill a 5-gal plastic container with flushing water for rinsing the drum pump as follows
  - [A] Open V-99
  
  - [B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND
  
  - [C] Open V-39
  
  - [D] Open the hose spigot at the outlet of V-39, and the fill container
  
  - [E] **WHEN** the container is full  
**THEN**
    - [a] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF
  
    - [b] Close V-39 and hose spigot
  
    - [c] Close V-99

**7.3 Chemical Cleaning Solution Make-up in Cleaning System Chemical Tank TK-9  
(continued)**

**Operator (continued)**

- [8] Open V-33 at the TK-9 chemical addition port.
- [9] Transfer the appropriate amount of acid or bleach, as required, from drum to TK-9 by using the electric drum pump with a 1-in. polyethylene (poly) discharge hose long enough to extend from drum to TK-9 chemical addition port
  - [A] Place the electric drum pump in the opening at the top of drum.
  - [B] Verify that the drum pump control switch is in OFF
  - [C] Plug the drum pump power cord into a 120V receptacle
  - [D] Attach the 1-in poly hose to the discharge of the drum pump
  - [E] Run the poly hose from the drum pump into the TK-9 chemical addition port.
  - [F] Place the drum pump control switch in ON and pump the contents from the drum into TK-9
  - [G] WHEN the drum is empty,  
OR the required volume has been pumped,  
THEN place the drum pump control switch in OFF
- [10] Repeat Steps [5] through [9] until TK-9 contains the appropriate amount of transferred chemicals
- [11] Rinse the drum pump stem, and flush the drum pump and hose into TK-9, after transferring chemical to TK-9 as follows
  - [A] Place drum pump into the 5-gal rinse water container
  - [B] Run the poly hose from the drum pump into the TK-9 chemical addition port
  - [C] Place the drum pump control switch in ON and pump the rinse water from the 5-gal container into TK-9
  - [D] WHEN the 5-gal container is empty,  
THEN place the control switch for the drum pump in OFF

**7.3 Chemical Cleaning Solution Make up in Cleaning System Chemical Tank TK-9  
(continued)**

**Operator (continued)**

[E] Drain the transfer hose into TK-9, and store properly

[F] Empty the rinse water remaining in the 5-gal container into TK-9 through the chemical addition port

**NOTE** *The 55-gal drum of hydrogen peroxide is located in the chemical storage container*

[12] **IF** hydrogen peroxide is to be added to the cleaning solution,  
**THEN** transfer 10 to 15 gallons of hydrogen peroxide from the 55-gal drum into the appropriate plastic containers using the hand drum pump

[13] Rinse the hand drum pump after use following the instructions provided in steps [7] and [11]

[14] Transfer the hydrogen peroxide from the appropriate plastic containers into TK-9 at a rate of 1 gal each 3 minutes

[15] **IF** additional hydrogen peroxide needs to be added during the chemical cleaning process  
**THEN** repeat Steps [12] through [14] to transfer the desired amount of hydrogen peroxide

[16] **WHEN** the chemical addition to TK-9 has been completed,  
**THEN** close V-33

[17] Record all activities in the OU2 Operations Log Book

**7.4 Filling Ferric Sulfate Feed Tank TK-4**

**Operator**

[1] Verify that all applicable prerequisite actions in Section 6, Prerequisites have been completed and record in the OU2 Operations Log Book

[2] Don the required Personal Protective Equipment (PPE) in accordance with the HASP

[3] Place a clean plastic bucket on the scale, and measure into the bucket the appropriate amount of ferric sulfate for the intended addition

The mixing ratio of ferric sulfate to water is 1 lb to 1 gallon

**7.4 Filling Ferric Sulfate Feed Tank TK-4 (continued)**

**Operator (continued)**

[4] IF the Mixer MX-4 is NOT running,  
THEN start Mixer MX-4 using the ON/OFF switch on the power cord.

[5] Verify closed the following valves in T900A.

- V-38
- V-39
- V-98
- V-99
- AV-14 at the control panel

[6] Verify closed the following valves in T900B

- V-59
- V-61
- V-84
- V-85
- Water tap above V-85

**NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running*

[7] IF the Filtrate Transfer Pump TP-11-1 is NOT running,  
THEN

[A] Open V-99

[B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND.

[8] Open V-38

[9] Open V-59

[10] Fill TK-4 to desired level

[11] Shut V-59

[12] Shut V-38

[13] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF

[14] Shut V-99

**7.4 Filling Ferric Sulfate Feed Tank TK-4 (continued)**

**Operator (continued)**

- [15] Slowly add premeasured ferric sulfate to TK-4. Examine the texture of the dry ferric sulfate before and during this process. Break up any lumps as they will cause splashing during the addition and may clog the metering pump suction.
- [16] Allow the mixer for TK-4 to run for at least 10 min to ensure proper chemical mixing.
- [17] Record all activities in the OU2 Operations Log Book.

**7.5 Filling Auxiliary Feed Tank TK-5**

**Operator**

- [1] Verify that all applicable prerequisite actions in Section 6, Prerequisites have been completed and record in the OU2 Operations Log Book.
- [2] Don the required Personal Protective Equipment (PPE) in accordance with the HASP.
- [3] Place the Mixer MX-5 control switch in ON.
- [4] Verify closed valves in T900A
  - V-38
  - V-39
  - V-98
  - V-99
  - AV-14 at the control panel
- [5] Verify closed the following valves in T900B
  - V-59
  - V-61
  - V-84
  - V-85
  - Water tap above V-85

**NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running*

- [6] **IF** Filtrate Transfer Pump TP-11-1 is NOT running  
**THEN**

[A] Open V-99

[B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND

**7.5 Filling Auxiliary Feed Tank TK-5 (continued)**

**Operator (continued)**

- [7] Open V-38
- [8] Open V-84
- [9] Fill TK-5 to desired level.
- [10] Close V-84
- [11] Close V-38
- [12] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF
- [13] Close V-99
- [14] **IF** adding liquid chemicals to TK-5,  
**THEN**
  - [A] Fill a clean 5-gal plastic bucket with rinse water for the drum pump, from the hose spigot located above V-85
  - [B] Procure the electric drum pump from T900B
  - [C] Ensure that the electric drum pump control switch is in OFF
  - [D] Place the drum pump suction tube into the chemical drum.
  - [E] Plug the power cord for the electric drum pump into a 120V receptacle
  - [F] Attach a 1-in polyethylene (poly) hose to the discharge line of the drum pump
  - [G] Run the poly hose from the drum pump to the chemical addition port and secure
  - [H] Place the control switch for the drum pump in ON
- [15] **WHEN** the required amount of chemicals have been pumped into TK-5,  
**THEN** place the drum pump control switch in OFF
- [16] Rinse the drum pump and hose
  - [A] Place the drum pump into the 5-gal rinse water bucket.
  - [B] Rinse the exterior of drum pump suction tube



**7.5 Filling Auxiliary Feed Tank TK-5 (continued)**

**Operator (continued)**

- [C] Run the poly hose from the drum pump and secure to TK-5 chemical addition port
- [D] Place the drum pump control switch in ON, and pump rinse water from the 5-gal container into TK-5
- [E] **WHEN** the 5-gal container is empty,  
**THEN** place the drum pump control switch in OFF
- [F] Drain the transfer hose into TK-5 and store properly
- [G] Empty the rinse water remaining in the 5-gal container into TK-5 through the chemical addition port
- [17] Store the electric drum pump in T900B
- [18] **IF** adding solid chemicals to TK-5,  
**THEN**
  - [A] Weigh the quantity of chemical(s) required to achieve the desired concentration using an appropriate container and a scale
  - [B] Break up any lumps which could cause splashing and plug the metering pump
  - [C] Add the chemical(s) to TK-5 slowly
- [19] Allow the mixer for TK-5 to run for at least 10 min to ensure proper mixing
- [20] Record all activities in the OU2 Operations Log Book

**7.6 Filling Lime Coagulant Chemical Feed Tank TK-6**

**Operator**

- [1] Verify that all applicable prerequisite actions in Section 6, Prerequisites, have been completed and record in the OU2 Operations Log Book
- [2] Don the required Personal Protective Equipment (PPE) in accordance with the HASP
- [3] Place the Mixer MX-6 control switch in ON

**76 Filling Lime Coagulant Chemical Feed Tank TK-6 (continued)**

**Operator (continued)**

**[4] Verify closed the following valves in T900A**

- V-38
- V-39
- V-98
- V-99
- AV-14 at the control panel

**[5] Verify closed the following valves in T900B**

- V-59
- V-61
- V-84
- V-85
- Water tap above V-85

**NOTE 1** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running.*

**[6] IF Filtrate Transfer Pump TP-11-1 is NOT running,  
THEN**

**[A] Open V-99**

**[B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND**

**[7] Open V-38**

**[8] Open V-61**

**[9] Fill TK-6 to desired level**

**[10] Close V-61**

**[11] Close V-38**

**[12] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF**

**[13] Close V-99**

**[14] At control panel #1, place the BLOWER control switch in ON**

**76 Filling Lime Coagulant Chemical Feed Tank TK-6 (continued)**

**Operator (continued)**

- [15] Add required amount of lime to the tank to achieve the correct lime solution for the addition process to be used (Wilden M 025 Pump 1 lb lime to 8 gal water, Warren Rupp Pump 1 lb lime to 1 gal of water)
- [16] Allow mixer in TK-6 to run for 10 min to ensure proper mix
- [17] Clean the lime hopper by scraping or spraying the lime into TK-6
- [18] At control panel #1, place the BLOWER control switch in OFF
- [19] **WHEN** blower has been off for at least 60 sec,  
**THEN** operate shaker handle on the side of the bag house for the filter bag six times
- [20] Clean up any lime dust that is produced while performing the above steps
- [21] Record all activities in the OU2 Operations Log Book

**77 Filling Outside Acid Tank**

**Operator**

- [1] Verify that all applicable prerequisite actions in Section 6, Prerequisites, have been completed and record in the OU2 Operations Log Book
- [2] Don the required Personal Protective Equipment (PPE) in accordance with the HASP
- [3] Verify closed valves in T900A
  - V-29
  - V-38
  - V-39
  - V-98
  - V-99
  - AV-14 at the control panel
- [4] Verify closed the following valves in T900B
  - V-59
  - V-61
  - V-84
  - V-85
  - Water tap above V-85
- [5] Attach a garden hose to the water hose spigot at V-39

**77 Filling Outside Acid Tank (continued)**

**Operator (continued)**

[6] Secure the unattached end of hose to the top of the acid tank so that the hose discharges into the tank

[7] Open V-99

**NOTE** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running*

[8] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND

[9] Open V-39 and hose spigot.

[10] Fill the tank with water to the predetermined level.

[11] Close V-39

[12] Fill a 5-gal plastic container with flush water for rinsing the drum pump.

[A] Open V-99

[B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND

[C] Open V-39

[D] Open the hose spigot at the outlet of V-39 and fill container

[E] **WHEN** the container is FULL,  
**THEN**

[a] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF

[b] Close V-39 and hose spigot

[c] Close V-99

[13] Transfer the predetermined amount of acid from drum to the 5-gal plastic container, using the electric drum pump

[A] Place the electric drum pump in the opening at top of drum.

[B] Verify that the drum pump control switch is in OFF

**77 Filling Outside Acid Tank (continued)**

**Operator (continued)**

- [C] Plug the drum pump power cord into a 120V receptacle
- [D] Attach a 1-in polyethylene (poly) hose to the discharge of the drum pump
- [E] Run the poly hose from the drum pump into the 5-gal plastic container
- [F] Place the drum pump control switch in ON and pump contents from drum into the 5-gal container
- [G] **WHEN** the 5-gal container is filled to desired level,  
**THEN** place the drum pump control switch in OFF
- [H] Carefully pour acid from the 5-gal container into the outside acid tank
- [14] Repeat Steps [13][F] through [13][H] until the outside acid tank has a 3% solution in the tank
- [15] Rinse the drum pump stem and flush the pump and hose into TK-9, after transferring chemical to outside acid tank
  - [A] Place the drum pump into the 5-gal flush water container
  - [B] Run the poly hose from the drum pump into the outside acid tank chemical addition port
  - [C] Place the drum pump control switch in ON and pump rinse water from the 5-gal container into the tank
  - [D] **WHEN** the 5-gal flush water container is EMPTY,  
**THEN** place the drum pump control switch in OFF
  - [E] Drain the transfer hose into the tank
  - [F] Empty the rinse water remaining in the 5-gal container into TK-9 through the chemical addition port
- [16] Properly store the electric drum pump in T900B
- [17] Record all activities in the OU2 Operations Log Book

## **8. RECORDS**

Management of all records is consistent with 1-77000-RM-001, Records Management Guidance for Records Sources

### **Project Manager**

- [1] Ensure that the original and one copy of the following quality-related records, as appropriate, are transmitted to the ERPD Project File Center in accordance with 2-G18-ER-ADM-17 01, Records Capture and Transmittal:

- OU 2 Operations Log Book
- Qualification/Training Documentation, as required
- Occurrence Reports, as required

Submission of record copies to the ERPD Project File Center satisfies Administrative Record requirements in accordance with 3-21000-ADM-17 02, Administrative Records Screening and Processing

There are no nonquality records generated by this procedure

## **9 REFERENCES**

Rocky Flats Plant Operable Unit 2 Field Treatability Unit Health and Safety Plan

1-10000-HWR, Hazardous Waste Requirements Manual

1-77000-RM-001, Records Management Guidance for Records Sources

2-G18-ER-ADM-17.01, Records Capture and Transmittal

3-21000-ADM-17 02, Administrative Records Screening and Processing

4-I60-ENV-OPS-FO 42, Chemical Cleaning Operations Operable Unit 2, Field Treatability Unit

**APPENDIX 1**

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**VALVE POSITION TABLE - NORMAL OPERATION**

VALVE NO	VALVE POSITION	VALVE NO	VALVE POSITION
V 1	0	V 58	0
V 2	0	V 59	C
V 3	0	V 61	C
V-4	0	V-64	0
V 5	0	AV-65	OAN
V-6	0	V-66	C
V 7	0	V-67	C
AV 8	C	AV-80	FLOW CONTROL
AV 9	C	V 81	C
V 10	0	V 82	0
AV 11	C	V 83	C
AV 12	C	V 84	C
AV 13	C	V 85	C
AV 14	C	V 86	0
AV 15	C	V 87	0
AV 16	C	V 88	C
AV 17	C	V 89	C
AV 18	C	V 90	C
AV 19	0	V 91	C
V 20	C	V 92	C
V 22	C	V 93	0
V 23	0	V 95	0
V 24	C	V 96	OAN
V 25	0	V 97	C
V 29	0	V 98	C
AV 30	C	V 99	C
V 31	0	V 100	0
V 33	C	V 101	C
V 34	C	V 102	C
AV 35	OAN	V 103	0
V 37	0	V 104	0
V 38	C	V 203	C
V 39	C	V 204	0
V-40	C	V 205	0
V-41	C	V 206	0
V 53	C	V 207	C
V 54	0		
V 55	C		
V 57	C		

KEY 0 = OPEN C = CLOSED OAN = OPENED AS NEEDED

APPENDIX 2  
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VALVE POSITION TABLE - SYSTEM SHUTDOWN

VALVE NO	VALVE POSITION	VALVE NO.	VALVE POSITION
V 1	0	V 58	C
V 2	C	V-59	C
V 3	C	V-61	C
V-4	C	V-64	0
V 5	C	AV-65	C
V-6	C	V-66	C
V-7	C	V-67	C
AV-8	C	AV-80	C
AV 9	C	V-81	C
V-10	0	V-82	0
AV-11	C	V-83	C
AV 12	C	V-84	C
AV-13	C	V-85	C
AV 14	C	V-86	0
AV-15	C	V-87	0
AV-16	C	V-88	C
AV 17	C	V-89	C
AV-18	C	V-90	C
AV 19	C	V-91	C
V 20	C	V-92	C
V 22	C	V-93	0
V 23	0	V-95	C
V 24	C	V-96	0
V-25	0	V-97	C
V 29	C	V-98	C
AV 30	C	V-99	C
V-31	0	V-100	0
V 33	C	V-101	C
V 34	C	V-102	C
AV-35	C	V-103	0
V-37	0	V 203	C
V-38	C	V-204	C
V 39	C	V-205	0
V-40	C	V-206	0
V-41	C	V-207	C
V-53	C		
V 54	0		
V 55	C		
V-57	C		

KEY 0 = OPEN C = CLOSED OAN = OPENED AS NEEDED



**APPENDIX 3**

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**OPERABLE UNIT 2 SYSTEM VALVES**

VALVE NO	SIZE/TYPE	MANUAL	LOCATION	FUNCTION
V-1	6 in BFLY*	M	Suction of PP-8-1	Feed to PP-8-1
V-2	6 in BFLY*	M	Discharge of PP-8-1	Feed to Top Train
V-3	6 in BFLY*	M	Discharge of PP-8-1	Feed to Middle Train
V-4	6 in BFLY*	M	Discharge of PP-8-1	Feed to Bottom Train
V-5	6 in BFLY*	M	Module Train Discharge	Discharge from Top Train
V-6	6 in BFLY*	M	Module Train Discharge	Discharge from Middle Train
V-7	6 in BFLY*	M	Module Train Discharge	Discharge from Bottom Train
AV-8	2 in BALL	A	Bottom Train Discharge	Cleaning Inlet
AV-9	2 in BALL	A	Top Train Inlet	Cleaning Outlet
V-10	2 in BALL	M	Cleaning Pump CP-1	Cleaning Pump Discharge
AV-11	2 in BALL	A	Cleaning Pump Discharge	Cleaning Return to TK1 and 2
AV-12	2 in BALL	A	TK-9	CP-1 Pump Suction
AV-13	2 in BALL	A	TK-10	CP-1 Pump Suction
AV-14	2 in BALL	A	TK-9	TK-10 Fill Inlet
AV-15	2 in BALL	A	TK-9	TK-9 Cleaning Return
AV-16	2 in BALL	A	TK-9	TK-9 Filtrate Return
AV-17	2 in BALL	A	TK-10	TK-10 Cleaning Return
AV-18	2 in BALL	A	TK-10	TK-10 Filtrate Return
AV-19	3 in BFLY	A	Filtrate to Neutralization	Filtrate Open/Close
V-20	2 in BALL	M	TK-9 and TK-10	TK-9 and TK-10 Drain
V-22	2 in BALL	M	TK-8 Drain	TK-8 Drain
V-23	2 in BALL	M	Sludge Pump	Sludge Pump Suction
V-24	2 in BALL	M	TK-11	TK-11 Drain
V-25	2 in BALL	M	TP-11-1 Inlet	TP-11-1 Suction
V-29	2 in BALL	M	TP-11-1	Flow Control to GAC
AV-30	2 in BALL	A	Top Train Inlet	Cleaning Return to TK-8
V-31	2 in BALL	M	TP-11-2	TP-11-2 Feed

\* = Butterfly

**APPENDIX 3**

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-33	2 in BALL	M	TK-9	Chemical Fill
V-34	2 in. BALL	A	TK-10	Chemical Fill
AV-35	2 in BALL	M	Filtrate above PP-8-1	Filtrate Return to TK-8
V-37	1/2 in BALL	M	Seal Water Filter	Seal Water Filter Isolation
V-38	2 in BALL	M	TP-11-1	Trailer No 1 Water Supply
V-39	2 in BALL	M	TP-11-1	Trailer Hose Down
V-40	2 in BFLY*	M	Bottom Tram No 1	Train No. 2 Isolation
V-41	2 in BFLY*	M	Middle Tram No 2	Train No. 3 Isolation
V-55	2 in BALL	M	Effluent from TK-6	Drain
V-57	2 in. BALL	M	Effluent from TK-5	Drain
V-58	1 in BALL	M	Effluent from TK-5	Influent to Acid Metering Pump
V-59	1 in BALL	M	Influent to TK-4	TK-4 Fill Water
V-61	1 in BALL	M	Top of TK-6	Lime Tank Water Fill
V-64	1/2 in BALL	M	Top of TK-1	Acid Delivery
V-65	1 1/2 in BALL	M	Top of TK-2	Lime Delivery
V-66	2 in BALL	M	Bottom, Left Side, TK-1	Drain
V-67	2 in BALL	M	Bottom, Right Side, TK-2	Drain
AV-80	1 1/2 in BALL	A	Effluent from TK-11	Filtrate Discharge Flow Control
V-81	1/2 in BALL	M	Influent to TK-2	Sulfuric Acid Injection
V-82	1 in BALL	M	Effluent from Seal Water	Distribute Seal Water
V-83	3 in BALL	M	West End of T900A	Drain for T900A
V-84	1 in BALL	M	Top of TK-5	Influent Water to TK-5
V-85	1 in BALL	M	Influent Water to Lime	Lime Line Flush
V-86	1 in BALL	M	Effluent from TK-6	Lime Pump Suction Isolation
V-87	1 in BALL	M	Effluent from Lime Pump	Lime Pump Discharge Isolation

\* = Butterfly

**APPENDIX 3**

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-90	1 1/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-91	1 1/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-92	2 in BALL	M	Effluent from Sludge Wilden Pump	Drain
V-93	2 in BALL	M	Sludge Pump Suction	Sludge Pump Suction Isolation
V-94	3 in BALL	M	West End of T900B System	Drain for T900B
V-95	2 in BALL	M	Influent to TK-1	Influent Isolation
V-96	2 in GATE	M	Influent to TK-1	Flow Adjust to TK-1
V-97	1/2 in BALL	M	Influent Air to Filter Press	Blow Down Filter Press
V-98	2 in BALL	M	TK-11 Filtrate Recirculation	Recirculation from TK-11 to
V-99	2 in BALL	M	Effluent from TK-11	Recirculate TK-11
V-100	3 in GATE	M	Membrane Discharge	Control Flow to TK-11
V-101	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to TK-2
V-102	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to TK-2
V-103	3/4 in BALL	M	Influent to TK-12	TK-12 Flush Line
V-200	2 in BALL	M	Influent Line to GAC	Processed Water into GAC
V-201	2 in BALL	M	Effluent from EQ** Tank	Influent to TK-1
V-202	3 in BALL	M	Effluent Line to EQ** Tank	Influent to Pump or Sock Filters
V-203	2 in BALL	M	Influent Line to GAC	Recirculation to EQ** Tank
V-204	2 in BALL	M	Influent Line to GAC	Recirculation to EQ** Tank
V-205	PRESSURE	M	Influent Line to GAC	GAC Pressure Adjustment
V-206	3 in BALL	M	Treated Effluent Line before GAC A	Treated Effluent Discharge

\*\* = Equalization

**APPENDIX 3**

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-207	3 in BALL	M	Return Line to EQ** Tank before GAC A	Effluent Return to EQ** Tank
V-208	3 in BALL	M	Treated Effluent Line before GAC A	Influent to GAC A
V-209	3 in. BALL	M	Return Line to EQ** Tank before GAC A	Backwash Return to EQ** Tank
V-210	3 in BALL	M	Middle Line GAC Piping	Isolation Valve
V-211	3 in BALL	M	Treated Effluent Line	Effluent from GAC A
V-212	3 in BALL	M	Return to EQ** TK	Backwash or Rupture Disk
V-213	3 in BALL	M	Treated Effluent Line between GAC A and B	Influent to GAC B
V-214	3 in BALL	M	Return to EQ** TK	Backwash Return to EQ** Tank
V-215	3 in. BALL	M	Treated Effluent Line in	Treated Effluent Discharge
V-216	3 in. BALL	M	Return to EQ** TK in front	Backwash or Rupture Disk
V-217	3 in. BALL	M	Treated Effluent Line	Effluent from GAC B
V-218	3 in BALL	M	Return to EQ** TK	Backwash or Rupture Disk
V-219	3 in. BALL	M	Treated Effluent Line	Influent to GAC C
V-220	3 in. BALL	M	Return to EQ** TK between GAC B and C	Backwash or Rupture Disk Return to EQ**
V-221	3 in BALL	M	Treated Effluent Line in	Treated Effluent Discharge
V-222	3 in BALL	M	Return to EQ** TK in front	Backwash or Rupture Disk

\*\* = Equalization

**APPENDIX 3**

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-223	3 in BALL	M	Treated Effluent Line between GAC C and D	Effluent from GAC C
V-224	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash or Rupture Disk Return to EQ**
V-225	3 in BALL	M	Treated Effluent Line between GAC C and D	Influent to GAC D
V-226	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash Return to EQ** Tank
V-227	3 in BALL	M	Treated Effluent Line in front of GAC D	Treated Effluent Discharge
V-228	3 in BALL	M	Return to EQ** TK in front of GAC D	Backwash or Rupture Disk Return to EQ**
V-229	3 in BALL	M	Treated Effluent Line after GAC D	Effluent from GAC D
V-230	3 in BALL	M	Return Line to EQ** Tank after GAC D	Effluent Return to EQ** Tank
V-231	3 in BALL	M	Treated Effluent Line after GAC D	Final Effluent Discharge
V-232	3 in BALL	M	Return Line to EQ** Tank after GAC D	Final Effluent Return to EQ** Tank

\*\* = Equalization